OCONUS Satellite Proving Ground Meeting

NOAT - NWS Operational Advisory Team
OCONUS Update

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NOAT Lead

Chief, ESSD Alaska Region Headquarters
Thursday, July 24, 2014

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Outline

* Membership
* Weather Ready Nation (WRN)
* NOAT Vision
* NOAT Priorities
* Current Issues
* Conclusion

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NOAT – Provide guidance for the (SDEB) Science and Demonstration Executive Board to ensure science development, and Proving Ground (PG) and GOES-R and JPSS Risk Reduction (R-3) are aligned with NWS operational priorities. The NOAT does not fund the future projects nor do we determine what is funded. We are an advisory group to the SDEB.

Membership (Scientific Services Division)

- Eric Howieson (Southern Region)
- Joshua Scheck (Central Region)
- Ken Johnson (Eastern Region)
- Andy Edman (Western Region)
- Carven Scott (Alaska Region)
- Bill Ward (Pacific Region)
- Jim Yoe (NCEP)

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Weather-Ready Nation (WRN)

- *The NWS published the Strategic Plan: Building a Weather-Ready Nation in 2011.*
- *The agency must implement this plan through 2020 (and likely beyond).*
- *The plan was built on 6 goals:*
  - **Goal 1:** Improve weather decision services for events that threaten lives and livelihood
  - **Goal 2:** Deliver a broad suite of improved water forecasting services to support management of the Nation's water supply
  - **Goal 3:** Enhance climate services to help communities, businesses, and governments understand and adapt to climate-related risks
  - **Goal 4:** Improve sector-relevant information in support of economic productivity
  - **Goal 5:** Enable integrated environmental forecast services supporting healthy communities and Ecosystems
  - **Goal 6:** Sustain a highly skilled, professional workforce equipped with the training, tools, and infrastructure to meet our mission

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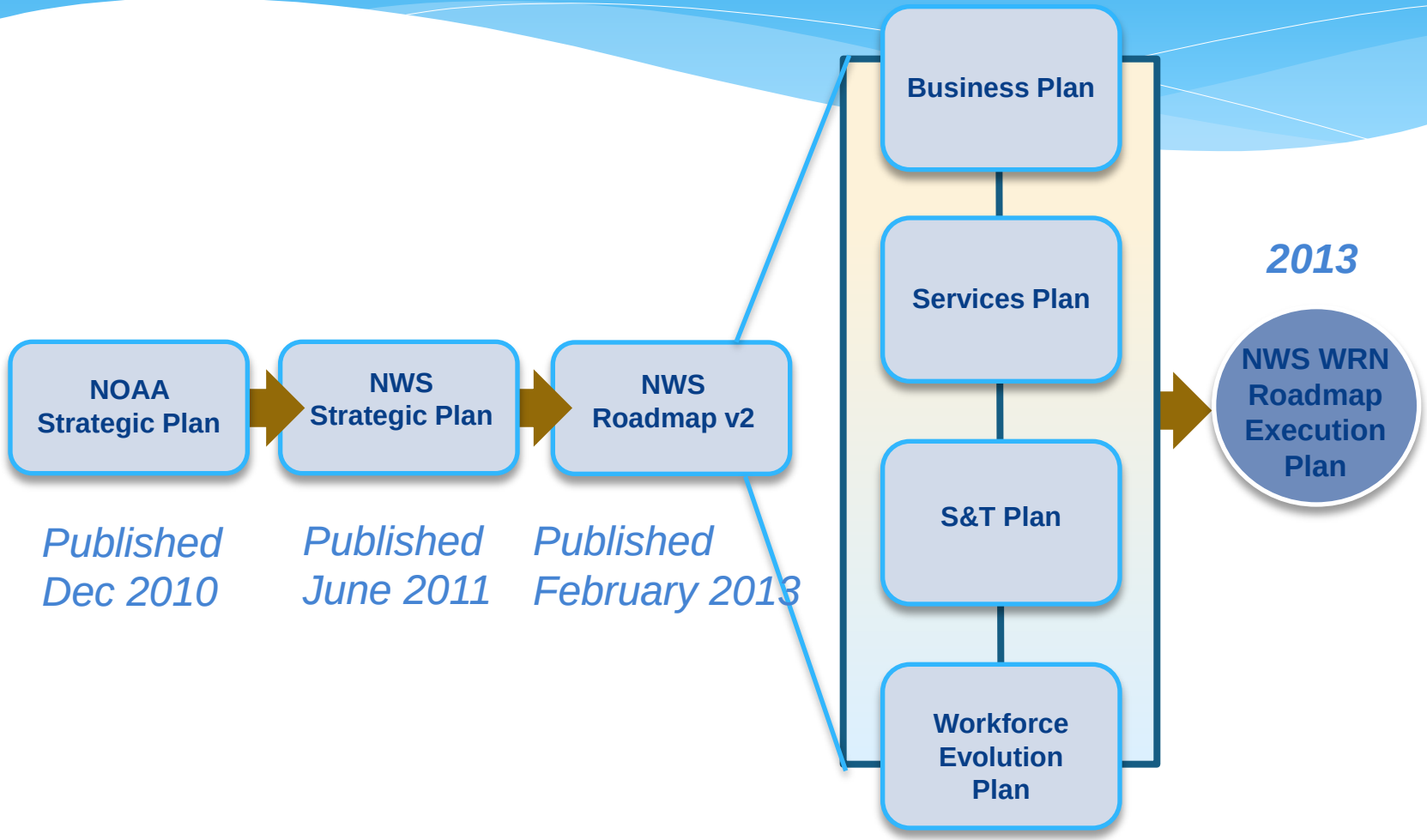
Weather-Ready Nation (WRN)



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WRN: What Does it REALLY Mean?

- WRN is a part of a broader NOAA vision to develop resilient ecosystems, communities, and economies.
- Emergency managers, first responders, government officials, businesses, and the public will then be empowered to make faster, smarter decisions to save lives and protect livelihoods.
- **The result: A WRN… where society is prepared for and responds to weather-dependent events.**

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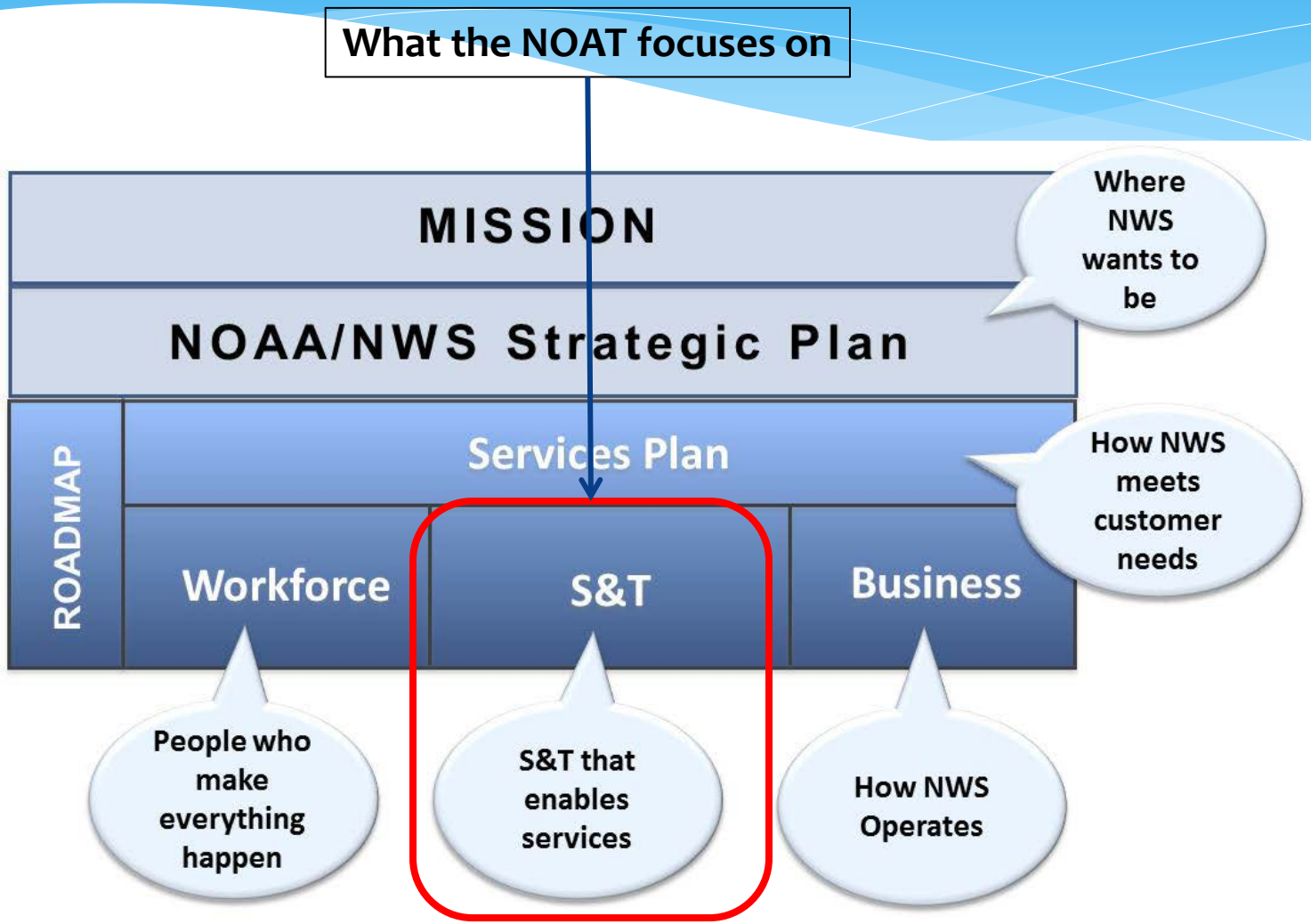
WRN - Science and Technology Concepts



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WRN - Science and Technology Concepts

- **The NOAT Science Vision (Key Themes) come from the Science and Technology (S&T) CAPSTONE document.**
- **Tied to Underlying S&T Concepts in WRN Roadmap:**
  - Best State of the Atmosphere (comprehensive situational knowledge)
  - Forecaster Decision Support Environment (FDSE)
  - Next-generation forecast system
  - Reliable forecast confidence and uncertainty
  - Agile, scalable, cost-effective data processing, management and dissemination
  - Research to Operations (R2O) and Operations to Research (O2R) (Risk Reduction, test beds, and dynamic training as a core function)

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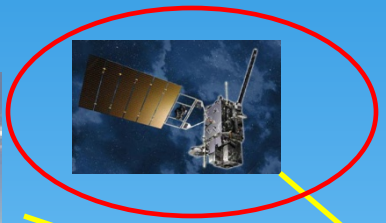
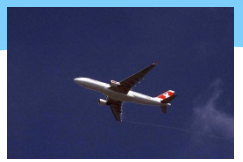
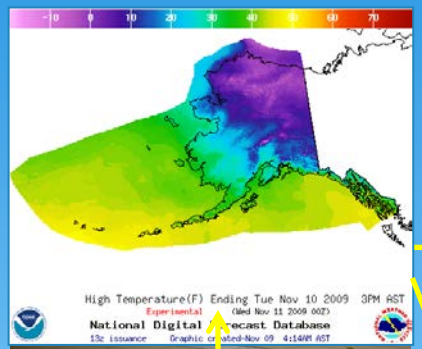
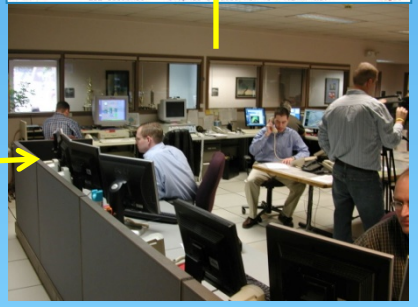
WRN – End to End Process

How we view the world









Services/Products

Satellite – Only one piece of the puzzle

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WRN - Science and Technology Concepts

Themes:

- Best state of the atmosphere
- Forecaster Decision Support Environment (FDSE)
- Next Generation Forecast System
- Forecast Confidence
- Data management and delivery
- Risk Reduction, test beds, and dynamic training as a core function

Challenges:

- Observational Gaps
- Initiation/explicit handling of convection
- Managing the forecast process
- Warn-on-Forecast (WoF)

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WRN - Science and Technology Concepts

So… Do you just throw a product at one of these problems/challenges/issues?

Some questions we ponder:

- What is the proposed project path to operations (R2O… Capital O)?
  - Current and future NWS operations
  - AWIPS II and/or evolving prototypes of future systems
  - Test bed, PG, operational (NWS) personnel?
  - Integrate into current/evolving operational modeling and data assimilation systems
- Is a project satellite-centric?
  - Okay **if** it makes sense
  - Fusion
    - Multisensor (more than just other sat sensors)
    - NOAA/NWS Integrated observation system and operational NWP
    - Don't forget potential end-user/stakeholder info (e.g., aviation routes, traffic)

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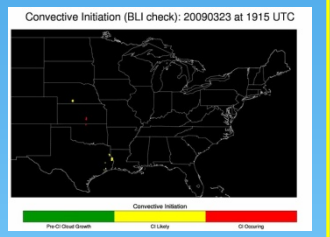
WRN - Science and Technology Concepts

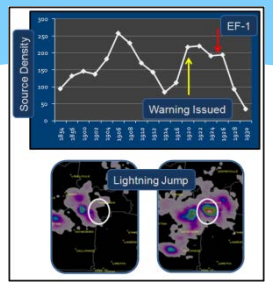
A Potential Operational Example: Convective Initiation/Severe Weather
Can we integrate the information in future tools?

CI

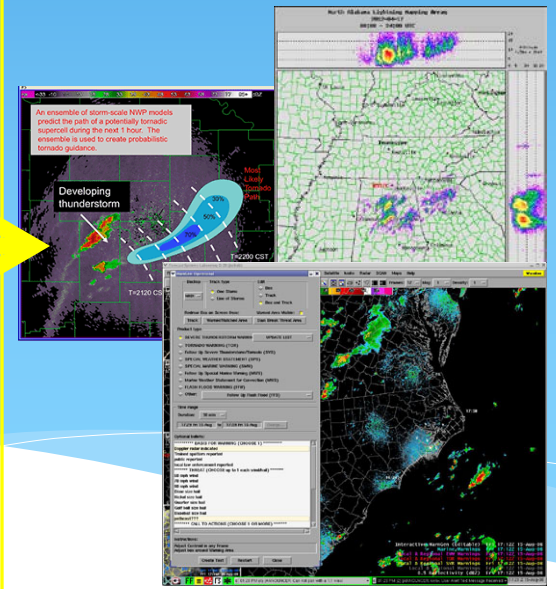


Over-shooting tops

Lightning Jumps



Next Generation Warning System



Why we need this?

Situational Awareness
Convective warning confidence
Decision Support (venues)

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Current Issues that Impact OCONUS

Training:

- H8 Training funded
- How does H8 training inform/influence NWS satellite training?
- NWS Satellite Training Program under development

(e.g., future of Liaisons, quantity and type of training, etc.)

Option 2 – Future Operational Capabilities

H8 -- GOES-R Integration

NWS Budget and HQ Restructuring

- OBS v. AFS v. STI v. DIS
- OCONUS ESSD's are different

GOES-R Scan Mode Alternatives:

- Continuous Full Disk
- Flex
- Hybrid

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Summary of ABI Scan Mode Alternatives

Continuous FD Mode: For large-scale animations and improved cloud-track wind derivation, but no 'super-rapid-scan' (SRS) imaging for mesoscale events.

Flex Mode: Unique opportunities for mesoscale imaging (SRS), but would be sub-optimal for cloud-tracked winds over most of the viewing region (important for global NWP).

Hybrid Mode: Improved cloud-tracked winds and mesoscale sampling, but with small interruptions to the SRS animations (and, any derived products)

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Current Issues that Impact OCONUS

GOES-R ABI "Flex" Mode (3) "CONUS" Coverage: Increase separation between CONUS views from West and East

Operationalization:

- The last mile (Capital O)
- Training
- AWIPS2

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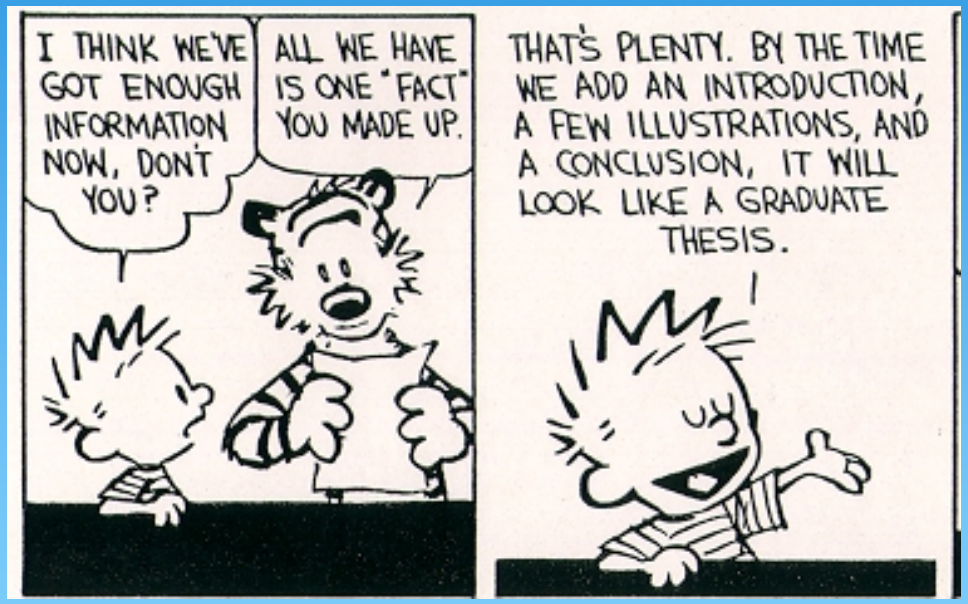

In Conclusion

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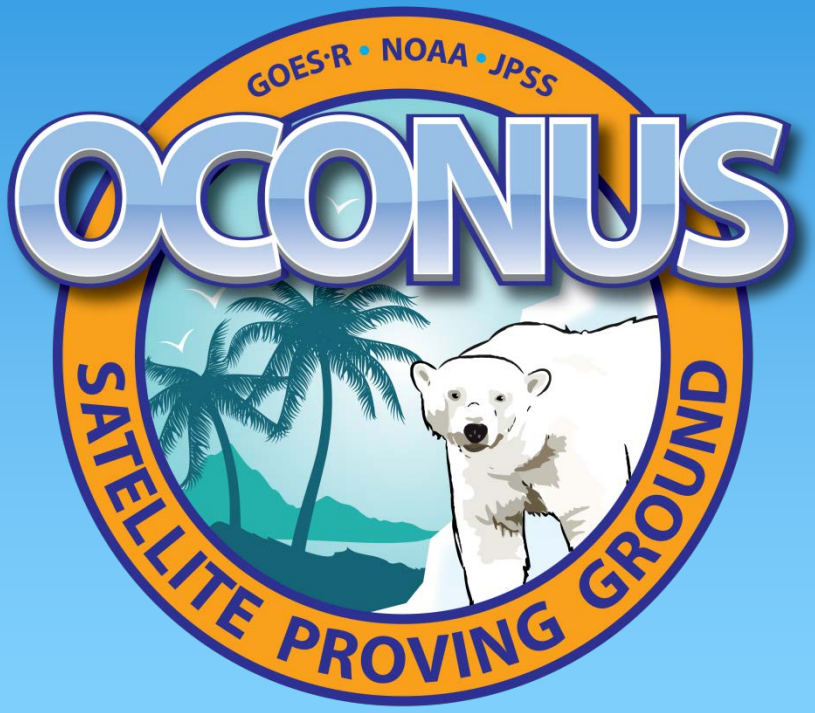

Questions?

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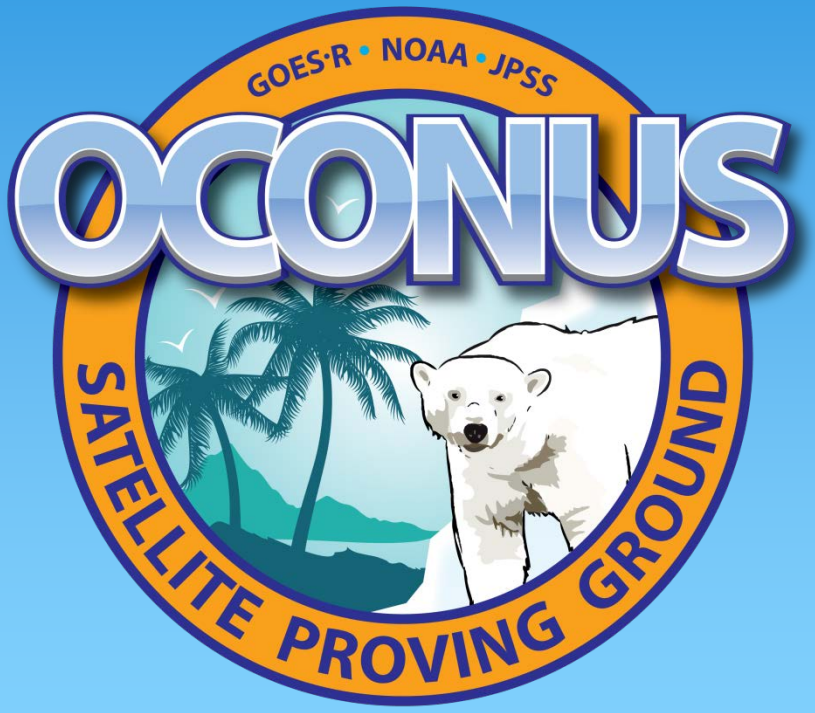

Additional Slides

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WRN - Science and Technology Concepts

Impacts and Issues:

- Initial zero hour of the forecast database and **data assimilation**
- Initial conditions to next generation modeling systems
- Forecaster assist in monitoring /QCing the forecast database
- Forecaster situational awareness
- Verification
- Better boundary layer depiction, especially low level distribution of moisture
- Enable concept of "Warn on Forecast"
- Improved QPE/QPF
- Development of general convection anticipated
- Improved boundary layer forecasts of cloud, fog and visibility
- Improved architecture for IDSS
- Input into advanced DS systems (Avn NextGen, fire wx, environmental/ecosystems)

How do you fit?

Smoke and dust
Moisture/clouds
Derived winds
Fire hot spots
QPE
SST
TPW
Snow/ice cover
Sea ice
Volcanic ash
Low clouds/fog
Visibility
CI
Overshooting Tops
Enhanced V
Lightning Jump
Stability Indices
Hurricane Intensity
Moisture profile
Nearcast, etc

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WRN - Science and Technology Concepts

More thoughts:

1. Leverage the concept of the "enterprise/framework" satellite system
   - Use the consistent upstream algorithms (when feasible)
2. Think strategically
   - Realize some of these ideas involve a "moving target" (e.g., next generation forecast and warning system/s, integrated obs system, etc.)
   - Try to "hit the target" vice development focused on current operations
3. Take time to understand how the forecaster does his job
   - Understand their job/challenges
   - See how they use the information in an operational setting (does it provide SA, or is it a DS tool?)
4. Embrace emerging requirements
   - Wind and solar energy
   - Ecosystems
5. Decision Support
   - Does it help the forecaster make decisions?
   - Does it help the customer make decisions?

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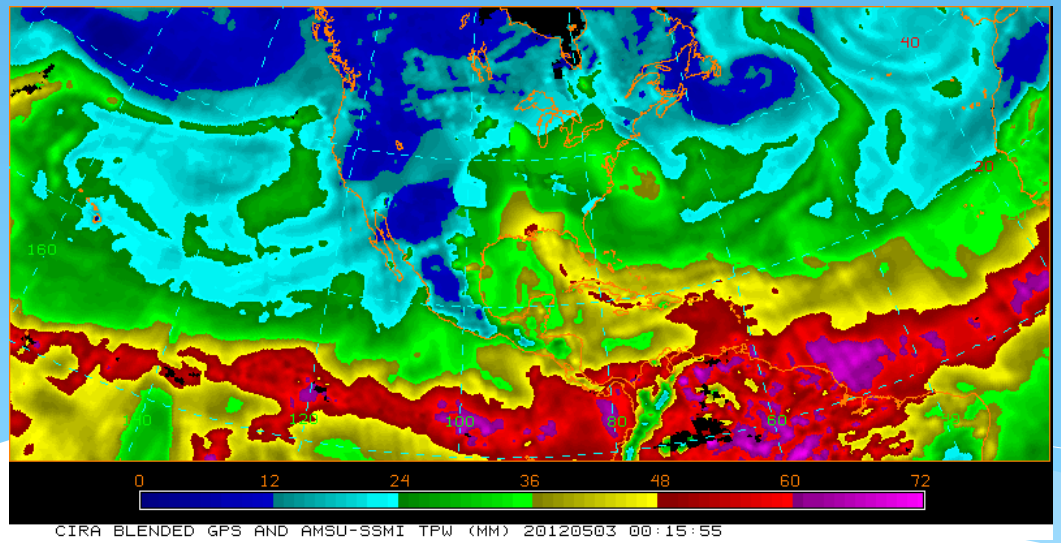
WRN - Science and Technology Concepts

An Operational Example: Blended TPW

Multisensor (GPS, AMSU-SSMI) product well used by forecasters because it dealt with a significant issue: moisture distribution



Why we need this?

Atmospheric Rivers
Heavy rain/snow
Flood/Blizzard
Drought
Convective Storms

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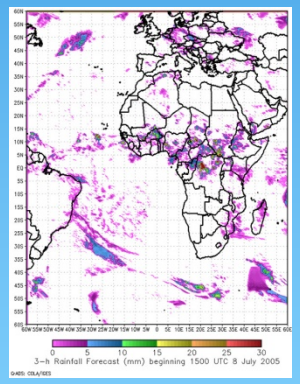
WRN - Science and Technology Concepts

A Potential Data Fusion Example: QPE

Can we do a Blended TPW-like QPE?

GOES R



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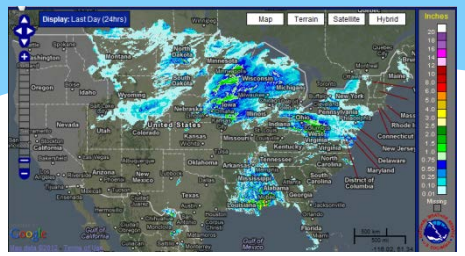

Radar/sfc obs

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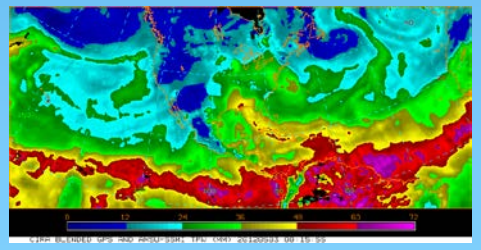
Global Precipitation



Why we need this?

Flood/flash flood
Transportation
Drought

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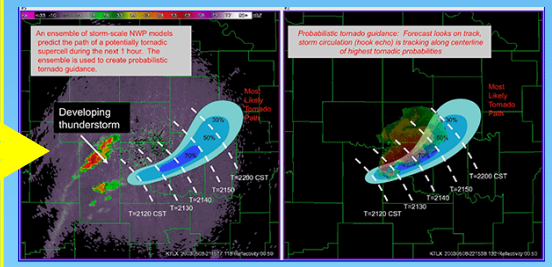
WRN - Science and Technology Concepts

A Potential Modeling Example: Convective Initiation/Severe Weather
Does it make more sense to assimilate the information into convective resolving NWP models?

JPSS /GOES-R radiances or other satellite data (CriS/ATMS)

Warn on Forecast (WoF) System



Why we need this?

Situational Awareness
Convective warning confidence
Decision Support (venues)

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NCEP Considerations

- **Central Guidance (EMC/NCO)**
- **Improved analysis and NWP forecasts a big target for operational use of observations**
  - Aim for future operational modeling/data assimilation systems
  - Coordinate via Joint Center for Satellite Data Assimilation
- **Service Centers (AWC, TPC, OPC, SWPC, SPC, and WPC)**
  - Centers appreciate new sensors, science and products
  - Discriminator for successful RR and PG products will depend on effective collaboration via respective Testbeds